

Work Plan for Building 912 PHENIX RPC Factory

Low Hazard – Worker Planned Work for Users

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Job Location: Building 912 D line area

Operation Manager:

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C-A Approval: _____ **Approval Date** _____
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Page: 1 to Page: 8

Worker Planned Work for Users at the PHENIX Assembly Area located in Building 912

September 2007

1. Introduction

Work Planning

This process applies to all physical work performed by BNL and non-BNL staff. Work Planning uses a graded approach to identify hazards, risks, and complexity levels of a task and to establish the level of rigor for planning and review. The process requires use of a site-wide work permit form (enhanced work permit, “green form”) for all moderate and high hazard work. **Worker Planned Work** [applies to low hazard and risk work] recognizes the capabilities of the work force. Personnel have the skill and technical capabilities to handle a wide variety of jobs with minimum documentation.

Worker Planned Work is formalized in three steps:

Pre-Job Brief

Job-Site Walk Down

Post Job Review

Pre-job Briefing Questions I Ask Myself Before I Start Work:

- * What are hazards for this particular work? How will I control them?
- * What are the critical steps to complete this work safely?
- * What can go wrong? What do I do if something goes wrong?
- * What actions do I take if a new hazard is found while I am working?

Job-Site Walk-down I Do Before I Start Work:

- * I thoroughly examined the job site
- * I ensured all hazards were identified and controls were adequate
- * I ensured my work will not affect other operations, and conversely
- * I ensured the risk level was low and I based this on job complexity, coordination need between groups and hazards for the work

Post-Job Feedback I Will Give to My Supervisor:

- * Task was/was not accomplished with expected results
- * Procedures and work documents were/were not accurate
- * Work planning and scheduling was/was not optimized to reduce human error or re-work
- * Job-site resources and information were/were not sufficient
- * My training for the job was/was not appropriate

Questions I Ask Myself Each Job and Each Day I Work:

What hazards are present for this job?

Is my supervisor or work planner aware of the hazards?
What part of this job concerns me? Have I asked for help?
What training/knowledge is needed to do the job safely?
Why do/don't people get hurt in my Group?
What is the safety climate at C-AD?
What are C-AD's standards for safety (intended & actual)?
What needs to be improved here?
Where are the danger zones for this job? What could go wrong?
What did the pre-job briefing and/or job-site walk-down cover?
Would more written procedures help me with my job?
Do I feel that I have adequate tools and PPE for this job?
Are Postings confusing or inappropriate?

Many of the tasks necessary to maintain and repair apparatus will be carried out by Physicists (Ph.D. and students). Much of this work is deemed to be within the "Worker Planned Work" and as such does not require additional work planning or work permits. The purpose of this document is to define which sorts of tasks fall within this "Worker Planned Work". The following requirements apply to all personnel working at the assembly area:

- No one person is allowed to work alone.
- The Operations Manager or designee will be informed of specific personnel working in the area, their duties, and their time schedule.
- All work will be performed by authorized and appropriately trained personnel listed on a published roster maintained current by the Operations Manager or designee.
- If tasks are not listed as "Worker Planned Work", consultation is required with a PHENIX Work Control Coordinator and/or Operations Manager, or the liaison engineer, to evaluate the task.
- Building 912 access is allowable for only those who have completed Collider User Training. Entry into any areas of building 912 that is posted "Radiation Area" is prohibited unless the individual has current Radiation Worker 1 training and follows the RWP requirements.

2. Electrical

Work on electrical devices is deemed Worker Planned Work:

- Voltage is < 50 V AC (or DC); AND maximum current is < 10 mA or stored energy is < 10 Joules.

Electrical Circuit Breaker and Electrical Disconnect operation (> 50 VAC or DC) is PROHIBITED by USERS without specific authorization and electrical worker safety training.

Examples of tasks allowed under this definition include:

- removing and replacing electronic modules in VME, NIM, and CAMAC crates.
- connecting and disconnecting front panel cables (lemo, BNC, etc.) from electronics modules.
- instruments, detectors, and data acquisition systems may be tested and analyzed using conventional diagnostic equipment such as digital multimeters, oscilloscopes, network analyzers, etc
- cabling of the test stands readout and HV connections while power to the racks is switched off
- operation of test equipment to perform acceptance and performance testing (e.g. cosmic ray testing) and data taking shall be described in (a) test procedure(s) to be reviewed by appropriate PHENIX and C-A personnel. Such procedure(s) shall be read and acknowledged by all persons participating in any way in such tests and a copy of the procedure(s) shall be attached to this work plan.
- using logic analyzers to debug circuit boards.
- using Multimeters to check various currents and voltages on circuit boards.
- Using a computer (connecting and disconnecting computer to electrical outlet, connecting and disconnecting peripheral equipment to computer, turning on and off, etc.).
- Soldering of RPC readout electronics with lead-free solder

Examples of tasks which are **not allowed** under this definition include:

- working with 110, 208, or 480 VAC line power sources.
- operation of 110VAC circuit breakers or disconnects
- measuring the output of the PMT High Voltage supply with a hand held multimeter.

3. Mechanical

Movement of mechanical equipment around the PHENIX Assembly Area is allowed if:

- No objects greater than 40 kg is to be lifted by hand
- The lifting of objects greater than 20 kg is done by two persons

Examples of tasks allowed under this definition include:

- moving computers around the facility
- moving hodoscopes into the test-stands
- removing crates from electronics racks (once they have been unplugged)
- carrying diagnostic equipment (multimeters, oscilloscopes, logic analyzers, etc.) around the facility.
- use of portable mechanical lift table (i.e. foot operated)
- Assembly of RPC components and support structures shall be in strict accordance with appropriate engineering design drawings and written assembly procedures reviewed and approved by cognizant PHENIX and C-A personnel.
- small amounts of gluing of light-guides with optical cement Saint-Gobain Company BC-600 using rubber gloves for skin protection and application of cement outside tent area, corresponding MSDS placed at the facility.

Examples of tasks **not allowed** under this definition:

- operation of building cranes
- operation of hydraulic systems
- operation of forklift
- operation of manlifts or working on scaffolding
- use of rigging equipment (e.g. come-alongs, etc.)
- use of bench mounted power tools

Only safety rated ladders (wood ladders are prohibited from use at C-A) are to be used, and a second person must be present for working on a ladder at heights above 1.2 meters (4 feet) or must be present during the tie off procedure.

4. Radiological

Building 912 PHENIX Assembly Area is a Radioactive Material Storage Area. It is posted as a **Controlled Area, Activation Check Required**. All existing material that is in building 912, except for materials brought in by PHENIX, must be checked for residual radiation by a Health Physics Technician (ext. 4660) prior to removal from the building.

Areas of the building adjacent to the PHENIX Assembly area are cordoned off with radiological signs and boundaries (yellow and magenta rope). Do not go beyond these barriers.

Past experimental work in this building has impacted the internal building environment. The wall, floors, ceiling may contain residual radioactive material, chemical residues, or metal contamination. Personnel should refrain from sitting on the floors or concrete walls

minimizing contact with your skin. Eating, drinking or smoking is prohibited in this building. Proper hygiene is required in this area, hand washing is recommended prior to eating, drink or smoking outside of this area.

5. Personal Protective Equipment (PPE)

PPE is required for many tasks outlined in this Work Plan. Specific PPE requirements will be issued from the Operation Manager or designee depending upon the task. The following are minimum requirements for PPE use in building 912:

Safety Glasses: Approved safety glasses with side shield are required for any work that may cause mechanical impact, particle inclusion, or chemical exposure to the eye.

Safety Shoes: Approved safety shoe are required when moving heavy objects, when the potential for personal exposure to abrasion, impact or other mechanical damage exists. Closed shoes are always required in building 912.

Gloves: Work gloves are required when the potential for personal exposure to abrasion, penetration, mechanical damage can occur. Specific gloves may be required for chemical and thermal exposures.

Hardhat: Required when working below an operating crane, or when working below others.

Long Shirts and Pants: Proper personal protective equipment (PPE) shall be worn at all times. In the absence of any superceding requirement long pants and long sleeve shirts are required at all times.

6. Environmental

All waste materials shall be properly disposed of as per C-A Department's and Laboratory's requirements.

Report all spills or releases of any potentially activated or hazardous materials immediately to the MCR ext. 4662 or CAS Watch ext. 2024, or C-A ESSHQ Division Head, Ray Karol ext. 5272. Immediate response to spills greater than 5 gallons are to be reported to BNL Spill Response Team at ext 2222. Disposition of test components, assemblies, and peripheral equipment associated with the assembly area are the responsibility of the experimental collaboration.

The C-AD Environmental Coordinator (Joel Scott x7520) can be consulted in the removal of waste.

7. Training

- Collider User Training (AD-CA_COLLIDER_USER)
- Hazard Communication (HP-IND200)
- Cyber Security (GE-CYBERSEC)
- Guest Site Orientation (TQ-GSO)
- PHENIX Awareness Training (RC-PAT)

8. Work other than Worker Planned Work

Any tasks which do not fall within the definitions given above for worker planned work either:

The tasks are performed by persons who have been trained, and are documented as trained, in the procedure associated with that specific task.

OR

Require further work planning. For PHENIX this work planning consists of establishing appropriate approved procedures, with the procedure acknowledged/approved by the individual(s) performing the task, the Operations Manager, Work Control Coordinator, Safety Officer and/or Liaison Engineer as determined by the PHENIX Work Control Coordinator in accordance with C-A work planning procedures.”

Examples of tasks which require further work planning are:

- Modifications to facility air, gas, or water systems
- Installation, modification, or upgrade of electrical cabling
- Operation of circuit breakers
- Removal or use of CAD stored equipment in building 912.

9. Emergency Response

In the event of an emergency:

- ❑ If audible and/or visible alarms occur, evacuate the building, wait for CAS and/or emergency personnel arrival and instructions. When safely evacuated, call 2222 and supply any pertinent information, then call RPC safety system experts.
- ❑ For any other emergency, call 2222. If it is safe to do so, place all equipment in safe condition, render first aid/CPR if necessary. Call RPC safety system experts.

10. Additional Related Documents Appended to this Document

Document # PP-2.5.2.15-1, Rev. A PHENIX RPC Gas System OPS in the RPC Factory

Document # PP-2.5.5.6-10, Rev. A RPC Safety System Blue Sheet Certification Test Procedure

Document # PP-2.5.2.15-2, Rev. A PHENIX RPC HV & LV OPS in the RPC Factory

Document # PP-2.5.2.15-3, Rev. A Assembly and Testing Procedures for RPC components and subassemblies in the RPC Factory

C-A OPM 3.16 Emergency Procedure for the PHENIX Detector Building 1008 Complex

(NOTE: Additional documents may be added to the above as the relevancy and/or necessity of additional tasks are identified.)

IF YOU ARE NOT CERTAIN OF THE REQUIREMENTS AND AUTHORIZATIONS FOR THE TASK, STOP WORK AND CONTACT ONE OF THE PHENIX WORK COORDINATORS.

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